

R E M A R K S

This is in response to the Office Action of August 10, 2004. Claims 1-3 are cancelled, without prejudice. Claim 4 is amended to depend from claim 10. Typographical errors are corrected in claims 12 and 14. No new matter is introduced by this Amendment. Entry of this Amendment – in order to place the application into condition for allowance or into better condition for appeal – is respectfully solicited. With this Amendment, claims 4 and 10-14 remain pending in the application.

OBVIOUSNESS DOUBLE PATENTING

Claims 3 and 4 (before the cancellation of claim 3 and the amendment of claim 4 herein) were rejected on the ground of obviousness-type double patenting over claims 4 and 7-9 of US 6,232,258 B1. To the extent that it might be applied to claim 4 as amended, this ground of rejection is respectfully traversed.

The invention described in the '258 patent resides in (i) a catalyst composition for oxygenating a bridged cyclic hydrocarbon with oxygen and (ii) a catalyst consisting of a strong acid and an imide compound represented by one of formulae (1a), (1b), (1c), (1d), (1e), and (1f). The effect of the invention claimed in the '258 patent is that the bridged cyclic hydrocarbon can provide a ketone with a high rate of conversion and selectivity. See column 14, lines 1-19 and the Examples of the '258 patent. In contrast, a

catalyst of the present invention comprises a cyclic imide compound represented by the formula (II) – that is, an N-hydroxyphthalimide having a  $-C(=O)-OR^x$  group on its benzene ring, where  $R^x$  is a hydrocarbon group having five or more carbon atoms.

The differences in structure between the two are:

(a) in the '258 patent, the catalyst composition oxygenates a bridged cyclic hydrocarbon, while in the present invention the substrates are not limited;

(b) the '258 patent includes a strong acid as an essential component of its catalyst composition, while the present invention does not; and

(c) the '258 patent includes as catalysts cyclic imide compounds represented by formulae (1a), (1b), (1c), (1d), (1e), and (1f), while the catalysts of the present invention are not "cyclic imide compounds" broadly but N-hydroxyphthalimides having a certain structure with a  $-C(=O)-OR^x$  group on the benzene ring, where  $R^x$  is a hydrocarbon group having five or more carbon atoms.

Incidentally, the '258 patent teaches that regarding alkoxy carbonyl groups in the substituent  $R^3$ ,  $R^4$ ,  $R^5$ , and  $R^6$  of its formula (1c), one to four carbon atoms in the alkoxy moiety are preferred. Column 4, line 66 to column 5, line 2. In other words, the reference does not recognize the advantage of an N-hydroxyphthalimide having a hydrocarbon group having five or more carbon atoms in any alkoxy carbonyl substituent on the

benzene ring, not to mention the fact that the '258 patent has no description to suggest that such compounds exhibit high catalytic activity even in the absence of a strong acid and exhibit an excellent catalytic activity specifically in the absence of solvents or in the presence of low-polar solvents. Thus the '258 patent and the present invention manifestly have very different objectives and significantly different ways of achieving those objectives.

In accordance with the '258 patent, the bridged cyclic hydrocarbon can provide only a ketone, albeit with high conversion and selectivity. In contrast, the catalyst of the present invention can be used in a variety of radical reactions. The present reaction proceeds smoothly even in the absence of solvents or in the presence of low-polar solvents and therefore has a markedly improved reaction rate. Specification, page 28, line 13 to column 29, line 1.

Furthermore, the invention of the '258 patent aims to increase yields of ketone by using a strong acid, while the present invention comprises a catalyst which can be used even in low-polar solvents. Substrates of Examples 1 to 8 in the '258 patent are adamantane, which is a bridged cyclic hydrocarbon, whereas substrates used in the examples of the present application are cyclohexane in Examples 1 to 8, 2-octanol in Example 9, toluene in Example 10, and n-hexane in Example 11. A key feature of the present invention is that the present catalyst is effective in various reactions using various substrates. Thus the present invention is directed to a

different objective than is the '258 patent.

As demonstrated above, the present invention and the invention of the '258 patent clearly differ in both structure and effect. The '258 patent fails to suggest the above-mentioned structure or effects of the present invention. Accordingly, withdrawal of the rejection of claim 4, on the ground of obviousness-type double patenting over claims 4 and 7-9 of US 6,232,258 B1, is respectfully solicited.

OBJECTION: CLAIMS 3, 10, 13, 14

Objection was raised to claims 3, 10, 13, and 14. Applicants respectfully point out that the substituent designation  $\{R^xO-C(=O)\}_n-$  means that the benzene ring in Formula (II) may carry 1, 2, 3, or 4 substituent groups each having the formula  $R^xO-C(=O)-$ . When the benzene ring carries 2, 3, or 4 of those substituent groups, the 2, 3, or 4 groups can be the same or different. Therefore, withdrawal of the objection to claims 3, 10, 13 and 14 is respectfully solicited.

OBJECTION: CLAIMS 1, 2

Objection had also been raised to claims 1 and 2. The Examiner indicated that the claims both used the designation "Formula (I)" but that that designation referred to two different chemical structures. Actually, claim 1 referred to a Formula (I) – that is, Roman numeral "I", while claim 2

referred to a Formula (1) – that is, Arabic numeral “1”. Thus there was no inconsistency between the designations of the formulas in claims 1 and 2. Also, it is noted that the two lines on the lefthand side of Formula (I) are not used by Applicants to designate methyl groups. Instead they are bonds (open valences). Formula (1) in claim 2 describes preferred groups that can satisfy the open valences of Formula (I) in claim 1. This was previously recognized by the PTO, when the Examiner held that “claim 2 ... is subgeneric to claim 1 ... [and therefore] ... claims 1-4 should be grouped together as a search for the imide skeleton”. Office Action of 08/27/2003, page 2, bottom. In any event, the objection to claims 1 and 2 is rendered moot by their cancellation.

### **Conclusion**


Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a two (2) month extension of time for filing a reply in connection with the present application, and the required fee of \$450.00 is attached hereto.


Should there be any outstanding issues that need to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher (Reg. No. 28,781) at (703) 205-8008.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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